UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,590	02/15/2005	Naohiro Matsunaga	019519-455	6557

21839 7590 04/19/2007
BUCHANAN, INGERSOLL & ROONEY PC
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER	
HON, SOW FUN	
ART UNIT	**PAPER NUMBER**
1772	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,590	MATSUNAGA ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-21 and 23-30* is/are rejected.

7)☒ Claim(s) *22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/19/07 has been entered.

Response to Amendment

Rejections Withdrawn

2. The 35 U.S.C. 103(a) rejections of claims 15-28 over Nakamura as the primary reference, in the Office action dated 10/17/06, are withdrawn due to Applicant's amendment dated 03/19/07.

New Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

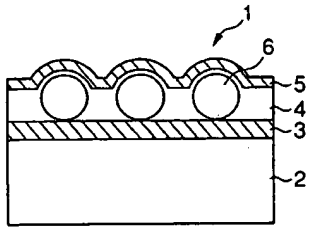
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 15-18, 23-25, 27, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hokazono (US 2001/005741) in view of Oka (US 5,909,314).

Claim 15 recites an antireflection film 1 comprising: a transparent support 2; and as an outermost layer, a low refractive index layer 5 containing a fluorine-containing polymer, wherein the low refractive index layer 5 comprises at least one inorganic fine particle 6 having an average particle size of 30 to 100% of the thickness of the low refractive index layer 5, and wherein the low refractive index layer 5 further comprises at least one silica fine particles having a particle size of less than 25% of the thickness of the low refractive index layer 5, as depicted in Fig. 1(a) of Applicant's disclosure (labeling, pages 1-2), shown on the next page.

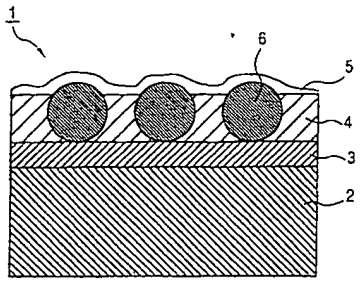
FIG. 1

(a)



In Fig. 1 below, Hokazono teaches an antireflection film 1 comprising a transparent support 2; and as an outermost layer, a low refractive index layer 5, wherein the low refractive index layer 5 comprises at least one fine particle 6 [0034]-[0040] having an average particle size having an average particle size within the range of 30 to 100% of the thickness of the low refractive index layer 5, as defined by Applicant in Fig. 1(a) above.

Fig. 1



Hokazono teaches that the low refractive index layer 5 contains a fluorine-containing polymer (page 7, [0115]), and that the fine particle 6 having an average particle size within the range of 30 of 100% of the thickness of the low refractive index layer 5, is inorganic (page 2, [0020]). Hokazono fails to teach that the low refractive

index layer further comprises at least one silica fine particle having a particle size of less than 25% of the thickness of the low refractive index layer 5.

However, Oka teaches an antireflection film (abstract) wherein silica fine particles having a particle size of not more than 10% of the size of the larger particles (silica having a particle diameter of not more than 0.5 microns is different the silica having a particle diameter of about 5 microns commonly used as the conventional matte material, column 9, lines 33-43), which is within the range of less than 25%, are added for the purpose of preventing the larger particles from settling (matte material likely to settle in the resin composition, column 9, lines 28-38) during formation of the film.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided at least one silica fine particle having a particle size of less than 25% of the size of the larger inorganic fine particles in the low refractive index layer, and hence less than 25% of the thickness of the low refractive index layer, in the antireflection film of Hokazono, in order to prevent the larger inorganic fine particles from settling during formation of the antireflection film, as taught by Oka.

Regarding claim 16, Hokazono teaches at least one hard coat layer 3 between the transparent support 2 and the low refractive index layer 5 (page 2, [0034]-[0040]).

Regarding claim 17, Hokazono teaches that the inorganic fine particle is a silica fine particle (page 2, [0020]).

Regarding claim 18, Oka further teaches that the at least one silica fine particle having a particle size of less than 25% of the thickness of the low refractive index layer

of Hokazono in view of Oka, is for the purpose of preventing the larger particles from settling, and that it has a particle size of no more than 500 nm so as not to provide any optical interference to the layer (affect transparency, 0.5 microns, coating, column 9, lines 27-40), which contains the claimed range of from 1 to 20 nm, as evidenced by Hokazono.

Hokazono teaches that light scattering does not occur when a fine particle has a particle size that is sufficiently smaller than the wavelength of light, or within the range of 100 nm or less (page 4, [0055]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a silica fine particle with a particle size of from 1 to 20 nm, as the at least one silica fine particle having a particle size of less than 25% of the thickness of the low refractive index layer of Hokazono in view of Oka, in order not to provide any optical interference to the low refractive index layer, as taught by both Oka and Hokazono.

Regarding claim 23, Hokazono teaches that the antireflection film comprises at least one high refractive index layer between the transparent support 2 and the low refractive index layer 5 (antiglare hard coat layer 3, binder has high refractive index, page 4, [0055]), wherein the high refractive index layer is a layer having refractive index of 1.57 to 2.00 (antiglare hard coat layer 4, page 2, [0043], binder has high refractive index, page 4, [0055]), which is within the range of 1.55 to 2.40, and mainly comprising titanium oxide (page 4, [0055]) which is also known as titanium dioxide in its stable form; and an inorganic fine particle containing at least one element selected from

aluminum and zirconium (a fine particle comprising at least one oxide selected from aluminum and zirconium, page 4, [0055]).

Regarding claim 24, Hokazono teaches that the low refractive index layer has a refractive index of 1.35 to 1.49 (page 2, [0043]), which is within the range of 1.20 to 1.49.

Regarding claim 25, Hokazono teaches a polarizing plate comprising a polarizer and two protective films of the polarizer, wherein one of the two protective films of a polarizer is the antireflection film (sheet polarizer comprising a polarizing layer sandwiched by two sheets of protective film, page 16, claim 11).

Regarding claim 27, Hokazono teaches an image display device comprising the antireflection film as the outermost surface of the display (layer, liquid crystal display device, page 17, claim 12).

Regarding claim 29, Hokazono teaches that the thickness of the low refractive index layer is preferably from 80 nm to 120 nm (0.08 to 0.12 microns, page 8, [0145]), which encompasses the claimed range of about 100 nm.

4. Claims 19, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hokazono in view of Oka, as applied to claims 15-18, 23-25, 27, 29 above, and further in view of Yasuda (US 6,210,858).

Hokazono in view of Oka teaches an antireflection film comprising: a transparent support; and as an outermost layer, a low refractive index layer containing a fluorine-containing polymer, wherein the low refractive index layer comprises at least one inorganic fine particle having an average particle size of 30 to 100% of the thickness of

the low refractive index layer, and wherein the low refractive index layer further comprises at least one silica fine particle having a particle size of less than 25% of the thickness of the low refractive index layer, as discussed above.

Regarding claim 19, Hokazono teaches that the refractive index of the low refractive index layer must be lowered sufficiently to reduce the reflectance of the antireflection film [0004]. Oka teaches that silica has a refractive index of 1.46 (SiO_x, column 33, lines 53-55). Hokazono in view of Oka, fails to teach that at least one of the silica fine particles in the low refractive index layer is a hollow silica fine particle having a refractive index of from 1.17 to 1.40.

However, Yasuda teaches an antireflection film comprising inorganic fine particles of hollow silica (porous, column 1, lines 65-67), wherein the refractive index is decreased by the micro voids (column 2, lines 32-35), for the purpose of lowering the refractive index of the silica particles.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have lowered the refractive index of the silica particle of Hokazono in view of Oka, from 1.46 to a value within the range of 1.17 to 1.40, by replacing it with a hollow silica fine particle, as taught by Yasuda, in order to provide the desired overall reduction in refractive index of the low refractive index layer, sufficient to reduce the reflectance of the antireflection film, as taught by Hokazono.

Regarding claim 30, Hokazono teaches that the refractive index of the low refractive index layer must be lowered sufficiently to reduce the reflectance of the antireflection film [0004]. Hokazono in view of Oka, fails to teach that the at least one

inorganic silica fine particle having an average particle size of 30 to 100% of the thickness of the low refractive index layer, is a hollow silica fine particle.

However, Yasuda teaches an antireflection film comprising inorganic fine particles of hollow silica (porous, column 1, lines 65-67), wherein the refractive index is decreased by the micro voids (column 2, lines 32-35), for the purpose of lowering the refractive index of the silica particles.

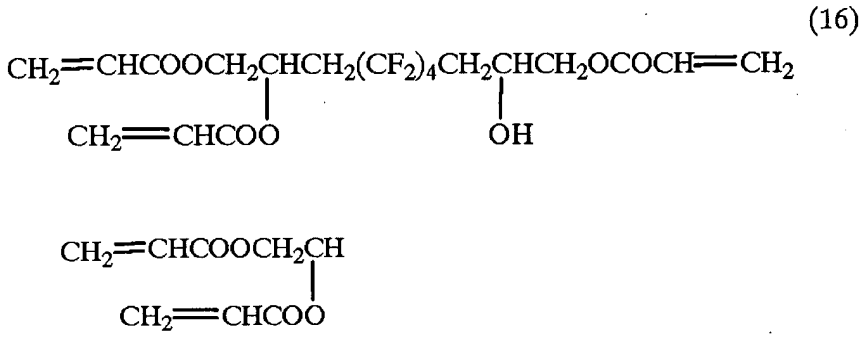
Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a hollow silica fine particle as one of the silica particles in the low refractive index layer of Hokazono in view of Oka, which lowers the refractive index, as taught by Yasuda, in order to provide the desired overall reduction in refractive index of the low refractive index layer, sufficient to reduce the reflectance of the antireflection film, as taught by Hokazono.

5. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hokazono in view of Oka, as applied to claims 15-18, 23-25, 27, 29 above, and further in view of Yoshida (US 6,254,973).

Hokazono in view of Oka, teaches a fluorine-containing polymer contained in the low refractive index layer of the antireflection film, as discussed above. In addition, Hokazono teaches that the fluorine-containing polymer contains a vinyl monomer polymerization unit (page 7, [0115]). Hokazono in view of Oka, fails to teach that the fluorine-containing polymer is a copolymer (P) having a main chain consisting of only carbon atoms, wherein the copolymer comprises a fluorine-containing vinyl monomer

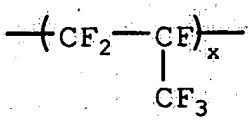
polymerization unit; and a polymerization unit having a (meth)acryloyl group on the side chain, let alone that the copolymer (P) as represented by Applicant' formula 1.

However, Yoshida teaches an antireflection film (reflection reducing film, abstract) formed from polymerizing the fluorine-containing monomer (curing, abstract, formula (16), column 13, lines 36-42) shown below.

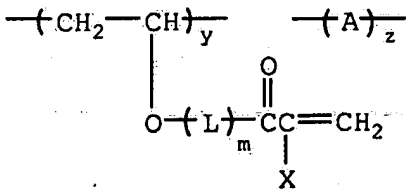


(16)

The $-(CF_2)_4-$ in the middle of the monomer of formula (16) of Yoshida, shown above, provides two repeat units of $-(CF_2-CF_2)-$ which is a homolog of the claimed fluorine-containing moiety of Applicant, shown below, with x =2.



The left portion of the monomer of formula (16) of Yoshida, shown above, is the claimed repeat unit of Applicant, shown below on the left, wherein y = 1, m = 0, X = H.



Yoshida teaches that the layer is formed with the monomer for the purpose of obtaining a low refractive index combined with high surface hardness, and high adhesion (column 11, lines 1-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a copolymer with formula 1 of Applicant, as the fluorine-containing polymer in the low refractive index layer of the antireflection film of Hokazono in view of Oka, in order to provide the desired low refractive index combined with high surface hardness and high adhesion, as taught by Yoshida.

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hokazono in view of Oka, as applied to claims 15-18, 23-25, 27, 29 above, and further in view of Yang (US 6,181,400).

Hokazono in view of Oka, teaches a liquid crystal display device comprising a polarizing plate comprising a polarizer and two protective films of the polarizer, wherein one of the two protective films of the polarizer is the antireflection film described above. Hokazono in view of Oka, fails to teach that the other protective film is an optical compensation film which comprises an optically anisotropic layer, wherein the layer has a negative birefringence and comprises a compound having a discotic structural unit, the disc plane of the discotic structural unit is inclined with respect to the surface protective film plane, and the angle made by the disc plane of the discotic structural unit and the surface protective film plane is changed in the depth direction of the optically anisotropic layer.

However, Yang teaches the use of an optical compensation film comprising an optically anisotropic layer which has negative birefringence, comprising a compound having a discotic structural unit, the disc plane of the discotic structural unit is inclined with respect to the surface protective film plane, and the angle made by the disc plane of the discotic structural unit is changed in the depth direction of the optically anisotropic layer discotic-type liquid crystalline film with negative birefringence (twist discotic-type liquid crystalline film with negative birefringence as a compensation film for a liquid crystal display, abstract), for the purpose of providing better view-angle characteristics, less color-shift and faster response times for the liquid crystal display (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used an optical compensation film comprising an optically anisotropic layer, wherein the layer has a negative birefringence and comprises a compound having a discotic structural unit, the disc plane of the discotic structural unit is inclined with respect to the surface protective film plane, and the angle made by the disc plane of the discotic structural unit and the surface protective film plane is changed in the depth direction of the optically anisotropic layer, as the other protective film for the polarizer of Hokazono in view of Oka, in order to provide better view-angle characteristics, less color-shift and faster response times for the liquid crystal display, as taught by Yang.

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hokazono in view of Oka, as applied to claims 15-18, 23-25, 27, 29 above, and further in view of Yamaguchi (US 6,633,353).

Hokazono in view of Oka, teaches a liquid crystal display device comprising a polarizing plate comprising a polarizer and two protective films of the polarizer, wherein one of the two protective films of the polarizer is the antireflection film described above. Hokazono in view of Oka, fails to disclose the mode or type of liquid crystal display device.

However, Yamaguchi teaches that a TN-mode reflective type (twisted nematic, column 5, lines 14-16) or STN-mode (super-twisted-nematic, column 5, lines 22-24) uses a polarizing plate comprising a polarizer with an antireflection film (polarizing film 10 subjected to anti-reflection treatment, column 7, lines 43-47) for the purpose of providing the desired polarized light.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the polarizing plate comprising antireflection film of Hokazono in view of Oka, in a liquid crystal display device of the TN or STN-mode reflective type, in order to provide the desired polarized light for the specific mode and type of display, as taught by Yamaguchi.

Allowable Subject Matter

8. Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest cited prior art of record, US 2001/005741, fails to teach or suggest, even in view of US 5,909,314, US 6,210,858, US 6,254,973, US 6,181,400 and US 6,633,353, the combination of structure and specific layer placement for an antireflection film comprising: a transparent support; and as an outermost layer, a low refractive index layer containing a fluorine-containing polymer, and at least one hard coat between the transparent support and the low refractive index layer; wherein the at least one hard coat layer is a light diffusing layer which has a scattered light intensity at a 30° angle of 0.01 to 0.2% based on the light intensity at an exit angle of 0° in a scattered light profile by a goniophotometer; and wherein the low refractive index layer comprises at least one inorganic fine particle having an average particle size of 30 to 100% of the thickness of the low refractive index layer and at least one silica fine particle having a particle size of less than 25% of the thickness of the low refractive index layer. None of the references teach the placement of a light diffusing hardcoat layer that has a scattered light intensity at a 30° angle of 0.01 to 0.2% based on the light intensity at an exit angle of 0° in a scattered light profile by a goniophotometer, between the transparent support and the low refractive index layer.

Response to Arguments

9. Applicant's arguments with respect to claims 15-28 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon.
Sow-Fun Hon
04/13/07

TERREL MORRIS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700